DOCUMENT RESUME

ED 254 916 EA 017 579

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TITLE An Advanced Multiple Alternatives Modeling Formulation for Determining Graduated Fiscal Support Strategies for Operational and Planned Educational Programs.
PUB DATE 24 Apr 84
NOTE 16p.; Paper presented to the Special Interest Group on Fiscal Issues, Policy and Finance at the Annual Meeting of the American Educational Research Association (New Orleans, LA, April 23-27, 1984).
PUB TYPE Viewpoints (120) -- Reports - Descriptive (141) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Budgeting; Computer Simulation; Data Analysis; *Decision Making; Elementary Secondary Education; *Financial Policy; Information Processing; *Models; Program Evaluation; *Retrenchment; Standards
IDENTIFIERS Decision Support Systems

ABSTRACT

A rationale is presented for viewing the decision-making process inherent in determining budget reductions for educational programs as most effectively modeled by a graduated funding approach. The major tenets of the graduated budget reduction approach to educational fiscal policy include the development of multiple alternative reduction plans, or scenarios, for each program under evaluation. The five main components of this model are described: program funding alternatives vector, funding criterion standards vector, coefficient data matrix, conditional policy standards vector, and decision-making optimality vector. The process the model follows during the evaluation of each program funding alternative is demonstrated through the use of simulation schematics; an example of this modeling formulation is examined, exploring how results are evaluated for their contribution to criterion standards validity and decision process reliability. Finally, a series of steps is recommended for the design, development, and use of a graduated budget reduction model. A 16-item list of selected readings and references is included. (TE)

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AN ADVANCED MULTIPLE ALTERNATIVES MODELING FORMULATION FOR DETERMINING GRADUATED FISCAL SUPPORT STRATEGIES FOR OPERATIONAL AND PLANNED EDUCATIONAL PROGRAMS

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Presentation to the Special Interest Group on Fiscal Issues, Policy and Finance
at the 1984 Annual Meeting of the American Educational Research Association
(New Orleans - April 24, 1984)

OBJECTIVES

[1] Present a rationale for viewing the decisionmaking process, inherent in determining budget reductions for education programs, as most effectively represented by a graduated funding approach;

[2] Introduce the major tenets of the graduated budget reduction approach to educational fiscal policy decisionmaking, including the development of multiple alternative reduction plans, or scenarios, for each program under evaluation;

[3] Survey the five (5) main components of the graduated budget reduction model (e.g. program funding alternatives vector, funding criterion standards vector, coefficient data matrix, conditional policy standards vector, and decisioning optimality vector);

[4] Demonstrate, through the use of simulation schematics, the standard model formulation of graduated budget reduction decisionmaking, and the process which the model follows during the evaluation of each educational program funding alternative;

[5] Examine a modeling formulation example, exploring how the results are evaluated for their contribution to criterion standards validity and decisioning process reliability; and,

[6] Discuss the recommended series of steps which fiscal decisionmakers should follow in the design, development and operationalization of a graduated budget reduction model for the ultimate choice of (1) which programs will be decreased (or increased)?, and (2) how much?

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THEORETICAL FRAMEWORK

The consistent use of simplistic budgeting reallocation strategies, such as (1) across-the-board percent reductions, (2) immediate termination or merging of important, though small-scale, programs, and (3) politically motivated, committee consensus approaches to determining optional budgets for reduction, have seriously handicapped the current instructional framework of both public and private education, at all elementary, secondary and post secondary levels. With the increasing availability of powerful computers for advanced data analysis, and the lessons learned through careful study of business and industrial strategies relative to similar budgeting problems, a new approach to determining (1) which programs will be budgetarily reduced (?), and (2) by how much (?), has been carefully researched, developed and validated for educational use. Utilizing a quantitative approach to the necessary alternative budgeting strategy comparisons, this model only requires a modest understanding of mathematics, yet provides the ability to systematically and simultaneously study each and every budgeting strategy deemed important to the district's goals.

EDUCATIONAL IMPORTANCE

Elementary and secondary education, as well as higher education, face a critical need to increase instructional program standards in a climate of reduced resource allocation. Education requires an evaluation modeling technique for (1) drafting new budgeting requirements and associated allocation standards, and (2) projecting the impact to the school district of the various budgeting alternatives which differential funding reductions will require. The model described in this paper proposal provides the key decisionmakers with the ability to utilize all available data in the comparative evaluation of the alternative program budget reduction strategies considered optional to the school district.

THE MISSION OF EDUCATIONAL FISCAL CRISIS BUDGETING

The general purpose of administrative, instructional and support service budgeting within an environment of emergency-level scant resources might be stated as follows:

> **To design a system of alternative budgeting alternatives, based upon likely scenarios for the future needs and demands of the educational institution, which can be compared and evaluated against established policy standards, and instructional and administrative requirements, resulting in the selection of which program budgets will be reduced, and by how much.**

Rationale. Graduated reductions imply that a continuum of variable reduction strategies per program exists for use by the administrator. During a time

of fiscal reduction, some programs must by necessity receive less allocations if the budget is to be balanced. At the same time, it is likely that some programs will exist which by nature of their complexity and quality will preclude any form of reduction, and might even warrant an increase in allocation. Budget reductions must be accomplished based upon program merit, production and the likelihood of their continued programmatic importance to the institution. Therefore, all programs have the potential to be differentially effected by any budget reduction decision impacting the institution as a whole. To responsibly effectuate such a differential strategy, all aspects of each program must be known including in which categories the allocated resources are expended (e.g. expenditure by fund and line item) and to what extent such expenditures can be linked to the quantity and quality of observable, institutional end-products.

THE SEVEN (7) GOALS OF EDUCATIONAL FISCAL CRISIS BUDGETING

Underlying this stated mission of graduated budgeting under fiscal emergency are seven (7) goals. Each goal refers to either a specific component (or components) of model design which must be incorporated into the decision simulation situation or a specific step in the process of decision simulation implementation which is (strongly) recommended.

THE FIRST GOAL OF FISCAL CRISIS BUDGETING

Prepare, for each program budget, the types and amounts of budgeting reductions which could be reasonably applied to the program budget, and in addition, prepare a narrative which would best describe the program after each type/amount of reduction.

Specific Component(s) of the Model. The first goal of fiscal crisis budgeting requires the model builder to (1) identify each program (budget) by name, (2) determine what changes can be adopted within the program which will lead to expenditure reduction(s), and (3) continue the previous task in a stepwise manner so that distinct program descriptions can be developed (viz. the narrative) to explain the functions of the program under each level of reduction determined. This activity leads to the construction of a vector of descriptors as shown below which define the columns of a to-be-designed 'coefficient matrix' of evaluative criterion measures for comparing each type of program reduction.

Budget #1				Budget #2			Budget #3	
00	15	25	**	00	05	**	00	**

This particular component of goal one defines a total of three programs which can be reduced (in terms of expenditure) four, three and two ways, respectively. The descriptor of '00' means no reduction, any other number refers to the per-

cent of reduction being compared, and '**' means total termination of the program (i.e. discontinuance, or 100 percent reduction).

THE SECOND GOAL OF FISCAL CRISIS BUDGETING

Define, across all program budgets, those measures of criterion reference which would best describe the resource needs, program contributions to district goals, and internal/external perceptions of the programs whose budgets are being evaluated.

Specific Component(s) of the Model. That part of the decision simulation model for fiscal reductions defined by the second goal is called the coefficient matrix -- a rectangle of values which are coordinated by the type/amount of reduction (identified by the column descriptor) and the particular fund, line item or other criterion standard being reduced (for example, a monetary line item or amount of instructional FTE loss) or otherwise impacted (e.g. perception of the predictable quality of a reduced program). Each coordinate (or cell) defined by a column-by-row intersection is a measure of criterion strength or weakness associated with such a level of reduction for that particular program based upon the criterion specified. As an illustration, the following figure defines the criterion measures for various levels of reduction across three identified programs by the use of nine (9) types of criterion references.

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	Budget #1				Budget #2			Budget #3	
	00	15	25	**	00	05	**	00	**
Personnel	$11	$12	$13	$14	$15	$16	$17	$18	$19
Example:	100	85	75	00	50	47	00	70	00
	(personnel costs expressed in $1000 units)								
Personnel	a_{11}	a_{12}	a_{13}	a_{14}	a_{15}	a_{16}	a_{17}	a_{18}	a_{19}
Example:	6.0	4.5	4.0	0	4.0	3.5	0	3.0	0
	(personnel requirements expressed in F.T.E. units)								
Policy 1.0	a_{21}	a_{22}	a_{23}	a_{24}	a_{25}	a_{26}	a_{27}	a_{28}	a_{29}
Example:	4.7	3.6	2.3	1.9	2.5	2.1	1.3	3.9	3.8
	Fails to Meet Most Requirements		Fails to Meet Some Requirements		Marginally Acceptable (Neutral)		Meets Most Requirements as Defined		Exceeds Most Requirements as Defined
	[1]		[2]		[3]		[4]		[5]
Policy 2.0	a_{31}	a_{32}	a_{33}	a_{34}	a_{35}	a_{36}	a_{37}	a_{38}	a_{39}
Example:	2.4	2.3	1.5	1.1	4.9	4.5	2.3	3.6	1.0
	(Scores assessed utilizing 5-point continuum displayed above)								
Opinion	a_{41}	a_{42}	a_{43}	a_{44}	a_{45}	a_{46}	a_{47}	a_{48}	a_{49}
Example:	5.8	4.7	3.2	2.8	4.7	3.2	3.1	4.3	1.7
	High Negative		Negative	More NEG Than POS	More POS Than NEG		Positive		High Positive
	[1]		[2]	[3]	[4]		[5]		[6]
Preference	a_{51}	a_{52}	a_{53}	a_{54}	a_{55}	a_{56}	a_{57}	a_{58}	a_{59}
Example:	25	50	10	15	66	33	1	85	15
	(Data represent percents of frequency, where respondents indicated which of the three (3) program scenarios they perceived to be of benefit to the organization en total.)								

When the coefficient matrix is viewed in its strictly quantitative form (without the above use of annotations, the matrix takes on the appearance of a rectangle

of values which allow a program-by-program comparison of potential budgetary reductions on a criterion-by-criterion basis. Thus the matrix:

	Budget #1				Budget #2			Budget #3	
	00	15	25	**	00	05	**	00	**
Personnel	$11	$12	$13	$14	$15	$16	$17	$18	$19
Personnel	a11	a12	a13	a14	a15	a16	a17	a18	a19
Policy 1.0	a21	a22	a23	a24	a25	a26	a27	a28	a29
Policy 2.0	a31	a32	a33	a34	a35	a36	a37	a38	a39
Opinion	a41	a42	a43	a44	a45	a46	a47	a48	a49
Preference	a51	a52	a53	a54	a55	a56	a57	a58	a59

allows a "top-to-bottom, left-to-right" comparison of multiple alternatives based upon multiple criterion standards.

THE THIRD GOAL OF FISCAL CRISIS BUDGETING

Select, for each criterion reference defined in Goal 2, the maximum (in the case of negative impact) and minimum (in the case of positive impact) impact to the educational institution which are sought based upon the types of programs reduced, and the amounts of each of their reductions.

Specific Component(s) of the Model. The component of the third goal is a column vector of values which will control (1) which program reduction levels are manageable based upon the fiscal crisis of the institution, (2) how the choice of one reduction level in one program will effect the necessary reduction level in another program, and (3) what the total impact to the institution will be based upon the mix of program-reductions chosen. This newest component to the model, known as the conditional or RHS (right-hand-side) vector, is added to the coefficient matrix and column-descriptors vector as followed:

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	Budget #1				Budget #2			Budget #3		
	00	15	25	**	00	05	**	00	**	
Personnel	$\$_{11}$	$\$_{12}$	$\$_{13}$	$\$_{14}$	$\$_{15}$	$\$_{16}$	$\$_{17}$	$\$_{18}$	$\$_{19}$	<= $\$\$_1$
Example:	100	85	75	00	50	47	00	70	00	<= 195
	(personnel costs expressed in $1000 units)									
Personnel	a_{11}	a_{12}	a_{13}	a_{14}	a_{15}	a_{16}	a_{17}	a_{18}	a_{19}	<= $\#\#_1$
Example:	6.0	4.5	4.0	0	4.0	3.5	0	3.0	0	<= 11.0
	(personnel requirements expressed in F.T.E. units)									
Policy 1.0	a_{21}	a_{22}	a_{23}	a_{24}	a_{25}	a_{26}	a_{27}	a_{28}	a_{29}	>= b_2
Example:	4.7	3.6	2.3	1.9	2.5	2.1	1.3	3.9	3.8	>= 9.0

[1]	[2]	[3]	[4]	[5]
Fails to Meet Most Requirements	Fails to Meet Some Requirements	Marginally Acceptable (Neutral)	Meets Most Requirements as Defined	Exceeds Most Requirements as Defined

Policy 2.0	a_{31}	a_{32}	a_{33}	a_{34}	a_{35}	a_{36}	a_{37}	a_{38}	a_{39}	>= b_3
Example:	2.4	2.3	1.5	1.1	4.9	4.5	2.3	3.6	1.0	>= 7.5
	(Scores assessed utilizing 5-point continuum displayed above)									
Opinion	a_{41}	a_{42}	a_{43}	a_{44}	a_{45}	a_{46}	a_{47}	a_{48}	a_{49}	>= b_4
Example:	5.8	4.7	3.2	2.8	4.7	3.2	3.1	4.3	1.7	>= 16.0

[1]	[2]	[3]	[4]	[5]	[6]
High Negative	Negative	More NEG Than POS	More POS Than NEG	Positive	High Positive

Preference	a_{51}	a_{52}	a_{53}	a_{54}	a_{55}	a_{56}	a_{57}	a_{58}	a_{59}	>= b_5
Example:	25	50	10	15	66	33	1	85	15	>= 198

(Data represent percents of frequency, where respondents indicated which of the three (3) program scenarios they perceived to be of benefit to the organization en total.)

As before, the model takes on the appearance of a rectangle of values, but now with a control over (1) which columns will be chosen (i.e. which programs

reduced and by how much), by means of (2) what criterion measure (i.e. the type of reduction sought), while observing the (3) total impact sought to the institution (i.e. the constraint value).

	Budget #1				Budget #2			Budget #3		
	00	15	25	**	00	05	**	00	**	
Personnel	$\$_{11}$	$\$_{12}$	$\$_{13}$	$\$_{14}$	$\$_{15}$	$\$_{16}$	$\$_{17}$	$\$_{18}$	$\$_{19}$	<= $\$_{1}$
Personnel	a_{11}	a_{12}	a_{13}	a_{14}	a_{15}	a_{16}	a_{17}	a_{18}	a_{19}	<= $\#_1$
Policy 1.0	a_{21}	a_{22}	a_{23}	a_{24}	a_{25}	a_{26}	a_{27}	a_{28}	a_{29}	>= b_2
Policy 2.0	a_{31}	a_{32}	a_{33}	a_{34}	a_{35}	a_{36}	a_{37}	a_{38}	a_{39}	>= b_3
Opinion	a_{41}	a_{42}	a_{43}	a_{44}	a_{45}	a_{46}	a_{47}	a_{48}	a_{49}	>= b_4
Preference	a_{51}	a_{52}	a_{53}	a_{54}	a_{55}	a_{56}	a_{57}	a_{58}	a_{59}	>= b_5

This format produces a network of simultaneous, linear equalities and nonlinear inequalities which can then mathematically produce a list of multiple alternatives (which reduction for each of programs 1, 2 and 3) which will satisfy the constraints of the RHS-vector. From this list of alternatives (i.e. feasible solutions) must come the single, best (i.e. optimal) solution or program reduction decision. This is the function of the fourth goal in graduated reduction.

THE FOURTH GOAL OF FISCAL CRISIS BUDGETING

Assure, for each program being evaluated, that one and only one level (or type) of reduction (if any) is selected.

Specific Component(s) of the Model. The fourth component of the graduated fiscal reduction model is actually an extension (sub-matrix) of the coefficient matrix. This additional component allows the model to (1) identify all feasible, alternative solutions to the budget reduction problem facing the institution, (2) comparatively evaluate each feasible solution's ability to maximize positive (desireable) attributes of the organization and minimize negative (undesireable) attributes, but at the same time (3) allows the model to choose one and only one reduction strategy for each of the program being evaluated and compared. This control-function sub-matrix would appears as follows:

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	Budget #1				Budget #2			Budget #3		
	00	15	25	**	00	05	**	00	**	
Control #1	1	1	1	1						= 1
Control #2					1	1	1			= 1
Control #3								1	1	= 1

where the model must choose one reduction level per program. As a total matrix of values, the coefficient matrix with its conditional vector will appear as:

	Budget #1				Budget #2			Budget #3		
	00	15	25	**	00	05	**	00	**	
Personnel	$\$_{11}$	$\$_{12}$	$\$_{13}$	$\$_{14}$	$\$_{15}$	$\$_{16}$	$\$_{17}$	$\$_{18}$	$\$_{19}$	<= $\$\$_1$
Personnel	a_{11}	a_{12}	a_{13}	a_{14}	a_{15}	a_{16}	a_{17}	a_{18}	a_{19}	<= $\#\#_1$
Policy 1.0	a_{21}	a_{22}	a_{23}	a_{24}	a_{25}	a_{26}	a_{27}	a_{28}	a_{29}	>= b_2
Policy 2.0	a_{31}	a_{32}	a_{33}	a_{34}	a_{35}	a_{36}	a_{37}	a_{38}	a_{39}	>= b_3
Opinion	a_{41}	a_{42}	a_{43}	a_{44}	a_{45}	a_{46}	a_{47}	a_{48}	a_{49}	>= b_4
Preference	a_{51}	a_{52}	a_{53}	a_{54}	a_{55}	a_{56}	a_{57}	a_{58}	a_{59}	>= b_5
Control #1	1	1	1	1						= 1
Control #2					1	1	1			= 1
Control #3								1	1	= 1

The use of the control sub-matrix allows the model builder to identify variable program reduction levels (e.g. 15 percent v. 30 percent) without having to assure that either a higher reduction level is inclusive of a lower level or furthermore that the various levels are total mutually exclusive.

THE FIFTH GOAL OF FISCAL CRISIS BUDGETING

Determine which of the criterion comparison references, defined in Goal 2, will be utilized to guide the final selection of which budgets will be selected for reduction, and the amount of that reduction, in the event that multiple district reduction strategies become available to the administrator of the educational institution.

Specific Component(s) of the Model. This last component of the model itself allows the selection of the optimal (best) solution alternative from the variety of feasible solution alternatives which might have been identified. This component is itself a row vector, appended to the base of the coefficient matrix, but without any RHS-value. The objective of this vector is to produce as large a value as possible (if maximizing a positive effect) or as small a value as

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possible (if minimizing a negative effect) via the use of simple summation. That is, the values in this vector which correspond to the solution alternatives being compared will be added together in order to detect the highest or lowest sum possible. The generalized numerical model might now appear as:

	Budget #1				Budget #2			Budget #3			
	00	15	25	**	00	05	**	00	**		
Personnel	$\$_{11}$	$\$_{12}$	$\$_{13}$	$\$_{14}$	$\$_{15}$	$\$_{16}$	$\$_{17}$	$\$_{18}$	$\$_{19}$	<=	$\$\$_1$
Personnel	a_{11}	a_{12}	a_{13}	a_{14}	a_{15}	a_{16}	a_{17}	a_{18}	a_{19}	<=	$\#\#_1$
Policy 1.0	a_{21}	a_{22}	a_{23}	a_{24}	a_{25}	a_{26}	a_{27}	a_{28}	a_{29}	>=	b_2
Policy 2.0	a_{31}	a_{32}	a_{33}	a_{34}	a_{35}	a_{36}	a_{37}	a_{38}	a_{39}	>=	b_3
Opinion	a_{41}	a_{42}	a_{43}	a_{44}	a_{45}	a_{46}	a_{47}	a_{48}	a_{49}	>=	b_4
Preference	a_{51}	a_{52}	a_{53}	a_{54}	a_{55}	a_{56}	a_{57}	a_{58}	a_{59}	>=	b_5
Control #1	1	1	1	1						=	1
Control #2					1	1	1			=	1
Control #3								1	1	=	1
MAXIMIZE	23	94	123	9	34	4	243	24	25		

This objective function, or optimality vector as it is sometimes called, actually is in mathematical use by the model from the very beginning of the decision-selection process. Although it is strongly recommended that such modeling be accomplished by one of the many integer programming routines available today, the use of the objective function when calculating a solution by-hand is essential.

THE SIXTH GOAL OF FISCAL CRISIS BUDGETING

Validate, for each of the criterion references utilized for determining the final types and amounts of program reductions, the extent to which each of these criterion references actually determined the final selection of those programs for reduction, and the amount(s) of those reductions.

Specific Component(s) of the Model. The sixth goal of fiscal modeling for budgetary reduction addresses the recognized need to understand (1) why one solution was chosen over another as well as (2) provide the ability to see what latitude the administrator has in selectively ignoring a model-produced solution in favor of an 'next-in-line' alternative. The vehicle utilized to perform this summative evaluation analysis is the simple statistical calculation of the parametric oneway analysis of variance, where the dependent variable(s) are the various measures of the criterion references, and the independent variables are dichotomous indications of whether each alternative (program) was selected for

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budgetary reduction or not, and at what level. A network or matrix of summative statistics known as the optimality weighting matrix is used to allow the administrator to compare the results of these computations. The discussion of such a matrix is beyond the scope of this present paper, and is therefore excluded. Interested parties are welcomed to contact the author directly for more information pursuant to the use of the optimality weighting matrix.

THE SEVENTH GOAL OF FISCAL CRISIS BUDGETING

Correlate, in terms of the programs chosen for reduction and the weights associated with each of these reductions, the final overall reduction strategy of the educational institution and the accuracy with which the institution can honestly trust the results of strategy.

Specific Component(s) of the Model. This seventh and last goal of graduated reductions is also concerned with summative analyses as to the viability of the solution(s) selected by the model. Using the parametric, regressive procedure of discriminant function analysis, statistical measures can be computed which will allow the administrator to view the (1) reliability with which the solutions can be viewed as accurate and (2) the accuracy with which to view the suggested solutions as predictable of expected outcome if the estimated reductions are executed. This is noted here for the reader, but is beyond the scope of this present paper. Again, interested parties should contact the author for more detailed information.

THE MULTIPLE ALTERNATIVES MODEL FOR GRADUATED BUDGET REDUCTIONS: A SUMMARY

In summary, the graduated budget reductions model can be viewed as a composite formulation of five components as follows:

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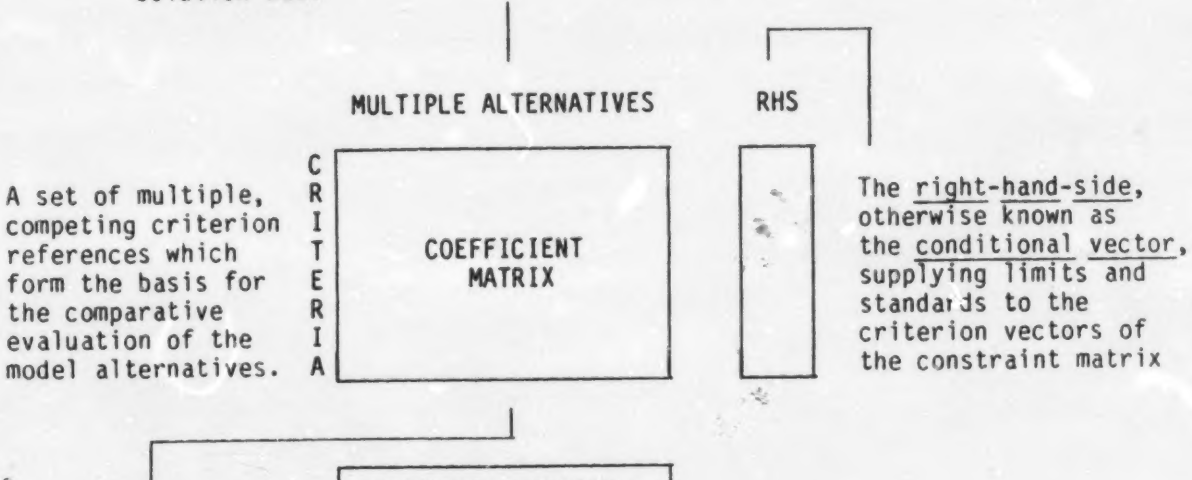
A collectively exhaustive set of mutually exclusive decisions which have been designated as feasibly reasonable reactions to the problem situation identified; and from which a subset of decision alternatives may be drawn to construct the final solution set.



A set (or series of sets in the case of cyclic optimality) of criterion values in the form of of linear terms which provides for the determination of the most optimal (i.e. the 'best') subset of decision alternatives in remediating the identified problem.

A set of simultaneous, linear inequalities and/or equalities which denote for each of the modeled alternatives (viz., the dependent variables), the value of each particular criterion's measure or influence (viz., the independent variables) related to that same particular alternative. Thus, the coefficients of each term in the linear inequalities represent the specific criterion measure for that particular term (i.e. alternative).

Recall that the use of the coefficient matrix in conjunction with the right-hand-side (RHS) or conditional vector provides the basis for formulating individual subsets of alternatives designated as **FEASIBLE SOLUTIONS** based upon the criterion constraints (i.e. the set of simultaneous linear inequalities). These subsets of feasible solutions are then analyzed via the objective function(s) for the final determination of the single **OPTIMAL SOLUTION subset.**

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CONCEPTUALIZATION OF THE GRADUATED BUDGET REDUCTION MODEL: A SUMMARY

Once again, the reader is reminded of the conceptual framework of the graduated model, not only from the mathematical viewpoint of the previous section, but also from the more species oriented viewpoint of what the model is actually trying to control and evaluate as it attempts to compare feasible alternative solutions for the best (optimal) strategy.

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	Budget Scenario A									....			Budget Scenario j				
	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--	POLICY
CRIT	+5	00	05	10	25	**	+7	+6	00	....	50	**	+9	00	10	**	LIMITS
	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--	

01 Projected budgeting allocation requirements, across budget scenario, by line item, must not exceed .....
TOTAL DISTRICT BUDGET

02 Projected resource requirements (personnel, facilities, equipment and materials) must not exceed .....
PROJECTED INSTITUTIONAL INVENTORY

03 Ability of the various budgeted programs to competitively supply services which will meet or exceed .....
PROJECTED INSTITUTIONAL NEEDS

04 Projected negative interrelationships and impact between and among institutional programs must not exceed .....
MAXIMUM NEGATIVE IMPACT

05 Projected positive interrelationships and impact between and among institutional programs must exceed .....
MINIMUM POSITIVE IMPACT

06 Prerequisite and corequisite relationships must be established in order to assure continuance of .....
INSTITUTIONALLY INTEGRATED PROGRAMS

07 Administrative, staff, faculty and community perceptions must provide the basis for understanding .....
MAXIMUM INSTITUTIONAL CONSENSUS

08 Projected personnel losses, reassignments, transfers or surpluses must not exceed an established .....
MINIMUM INSTITUTIONAL POLICY

09 Extent to which potential program budget reductions and/or terminations conform to various policies .....
MAXIMIZE INSTITUTIONAL GOALS

10 Each budget scenario must be evaluated and compared, and the final institutional solution must impact .....
EACH INSTITUTIONAL PROGRAM

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Typically, a model will house several hundred alternatives, depending upon the size of the institution and its various academic and non-academic programs, and might have just as many criterion references by which to compare each of the program reduction alternatives for effectiveness and satisfaction to the entire mission of the institution.

CONCLUSION

The use of the graduated budget reduction model (generally known as the multiple alternatives model) is a rational alternative to complex decision making when a fiscal crisis has occurred. Seldom are such crises unpredictable, and usually with the help of a research department or office of institutional studies, data can be collected on a continuing basis through which repeated executions of this model can help plan long-range strategies for administrators -- whether at the K-12 public private school level or at the community college or four-year university campus.